Managing Green House Gases: Getting It Right

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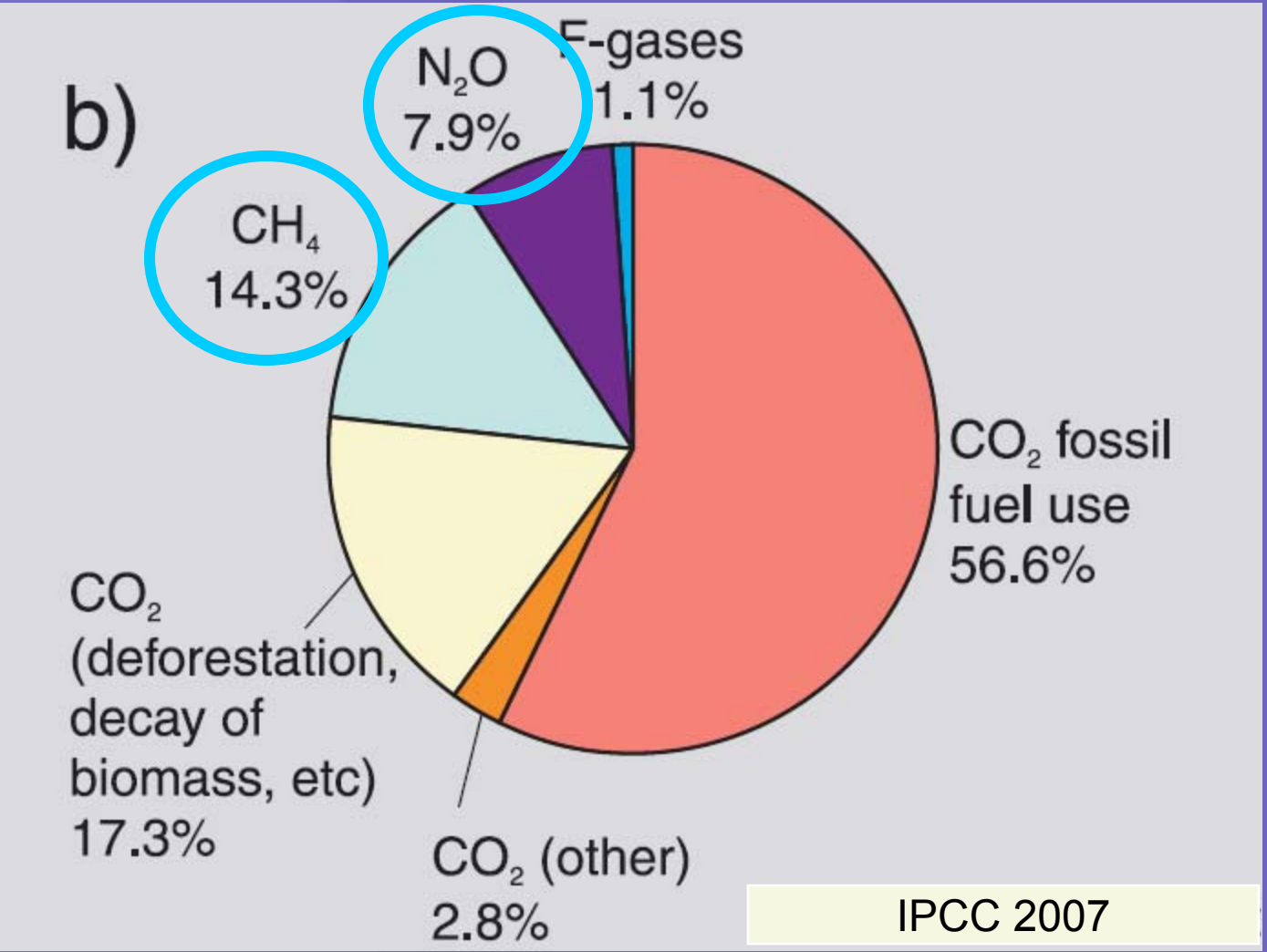
ENVIRONMENTAL DEFENSE FUND

finding the ways that work

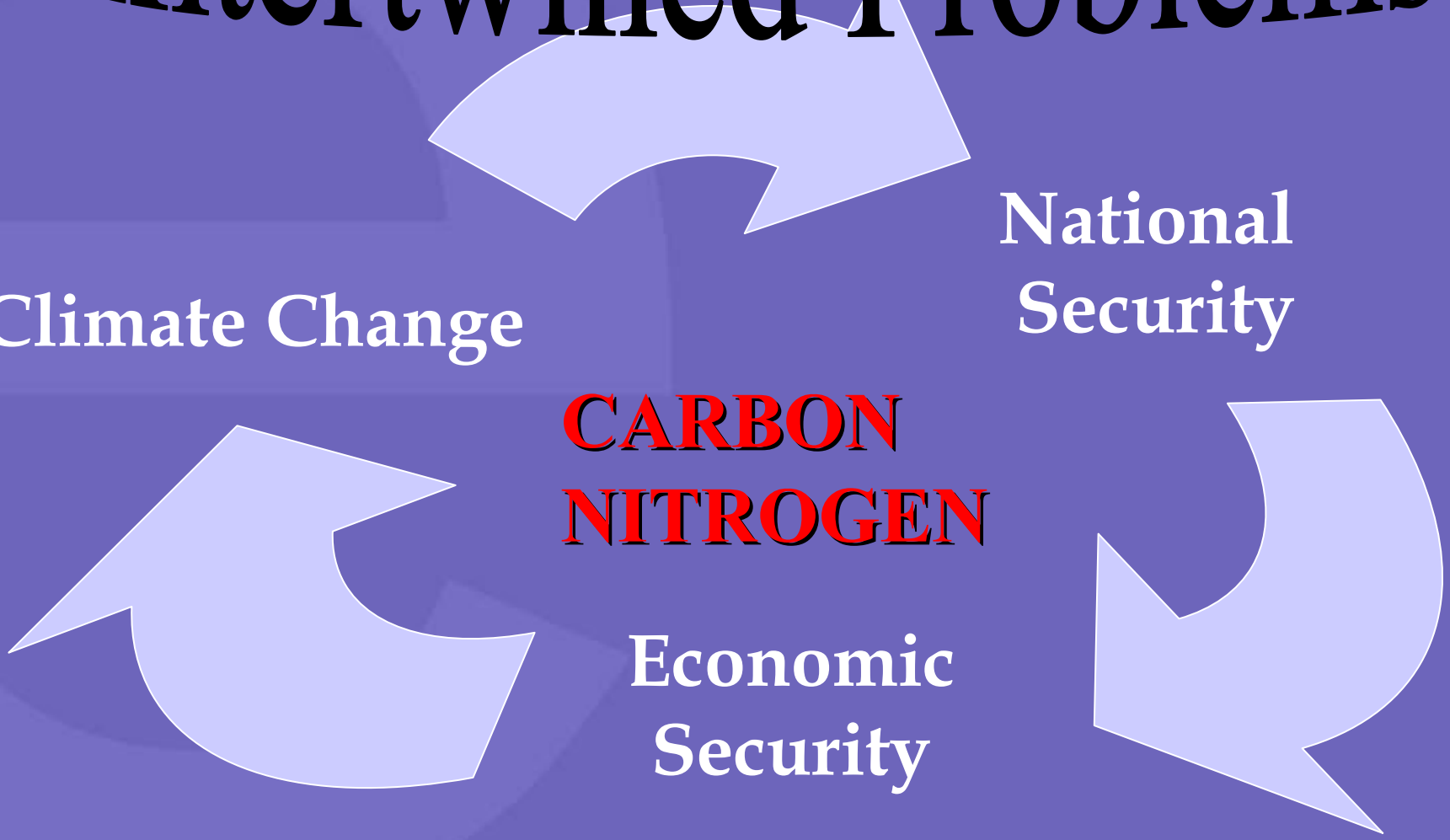
Global anthropogenic GHG emissions



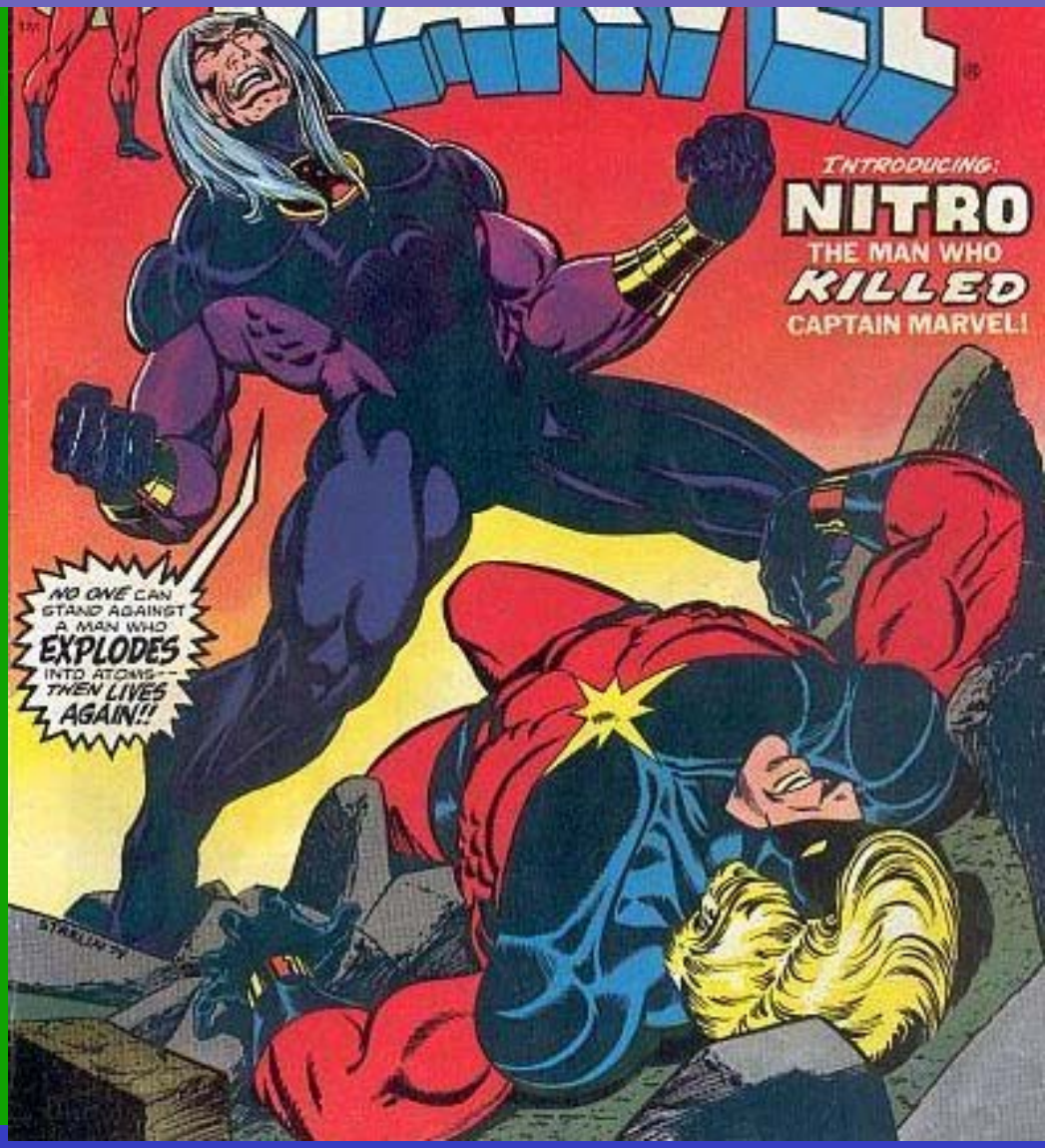
IPCC 2007

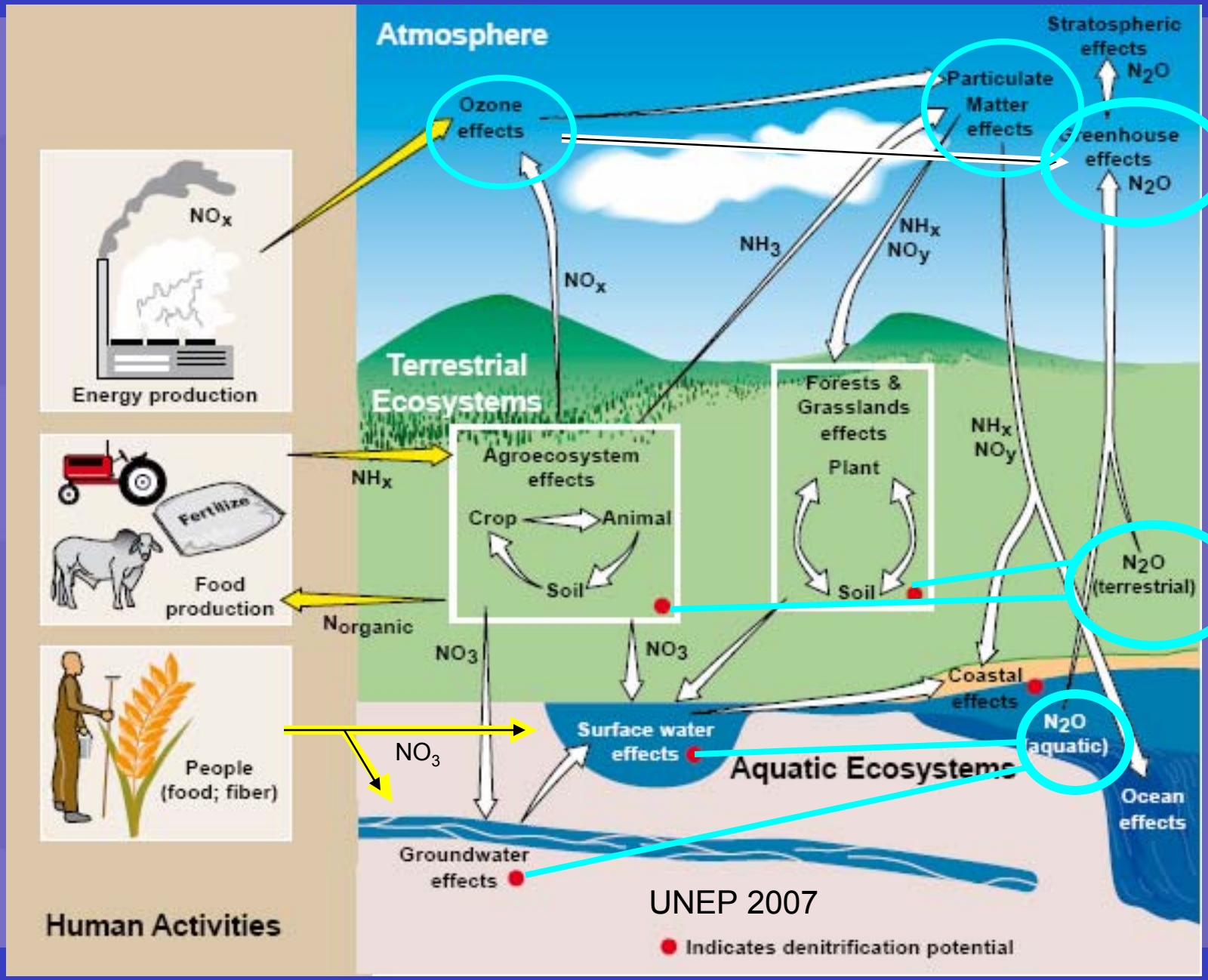
http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

Intertwined Problems



Two faces of nitrogen

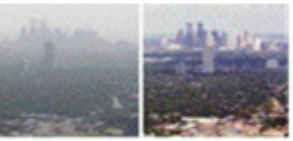
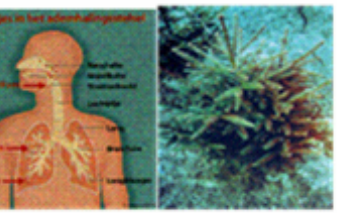



Atmosphere
Stratospheric effects
N_2O
Particulate Matter effects
Ozone effects
Greenhouse effects
N_2O
NO_x
NH_3
NH_x NO_y
NO_x
Terrestrial Ecosystems
Forests & Grasslands effects
Plant
Soil
NH_x NO_y
Agroecosystem effects
Crop
Animal
Soil
N_2O (terrestrial)
NH_x
Fertilize
Food production
$N_{organic}$
NO_3
NO_3
Coastal effects
Surface water effects
N_2O (aquatic)
Aquatic Ecosystems
NO_3
Ocean effects
People (food; fiber)
Groundwater effects
Energy production
Human Activities
UNEP 2007
Indicates denitrification potential

Anaerobic Digesters: A Look Under the Cover

- Methane capture
- Ammonia N build-up
- Ammonia N loss from effluent

Cascade effect of reactive nitrogen


Hours	days	Weeks	months	years	decades	centuries
air concentrations visibility						
	Deposition					
health (acute)			health (chronic)			
	aquatic (episodic)			aquatic (chronic)		
plant responses						
		Vegetation changes soil processes				
				soil nutrient reserves		
				forest ecosystem health		
				Carbon sequestration		
				materials		
					climate change	

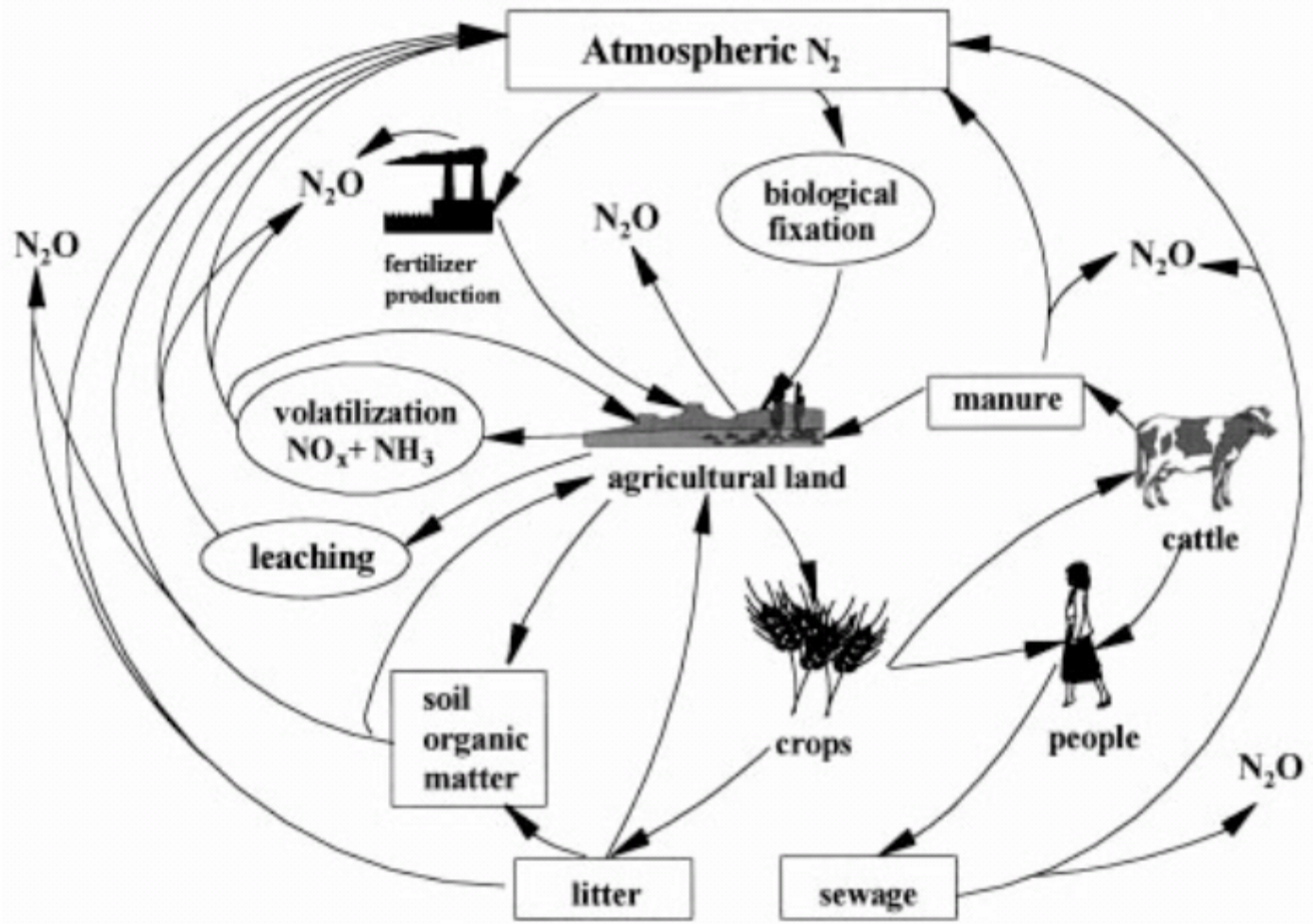
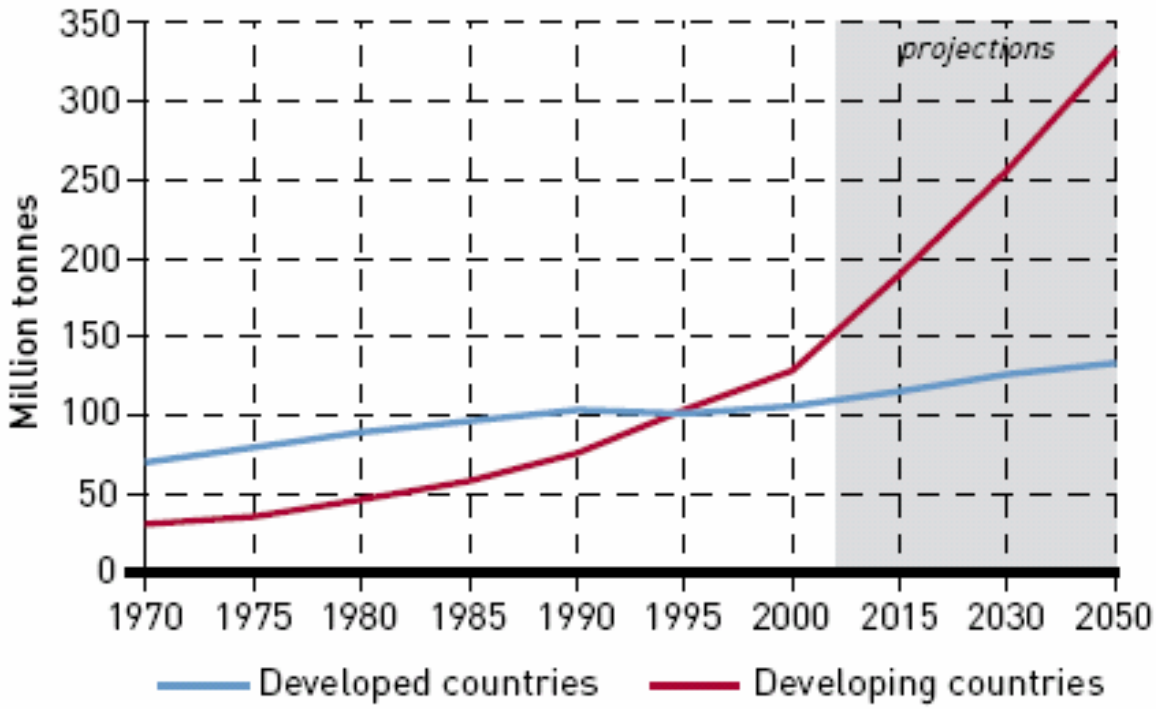


Figure 1. Depiction of the nitrogen cycle of agricultural soils and its relationship to N_2O production. (Adapted from Nevison et al., 1996; Oonk & Kroeze (1998) by permission of John Wiley & Sons, Inc.).

Mosier et al 1998

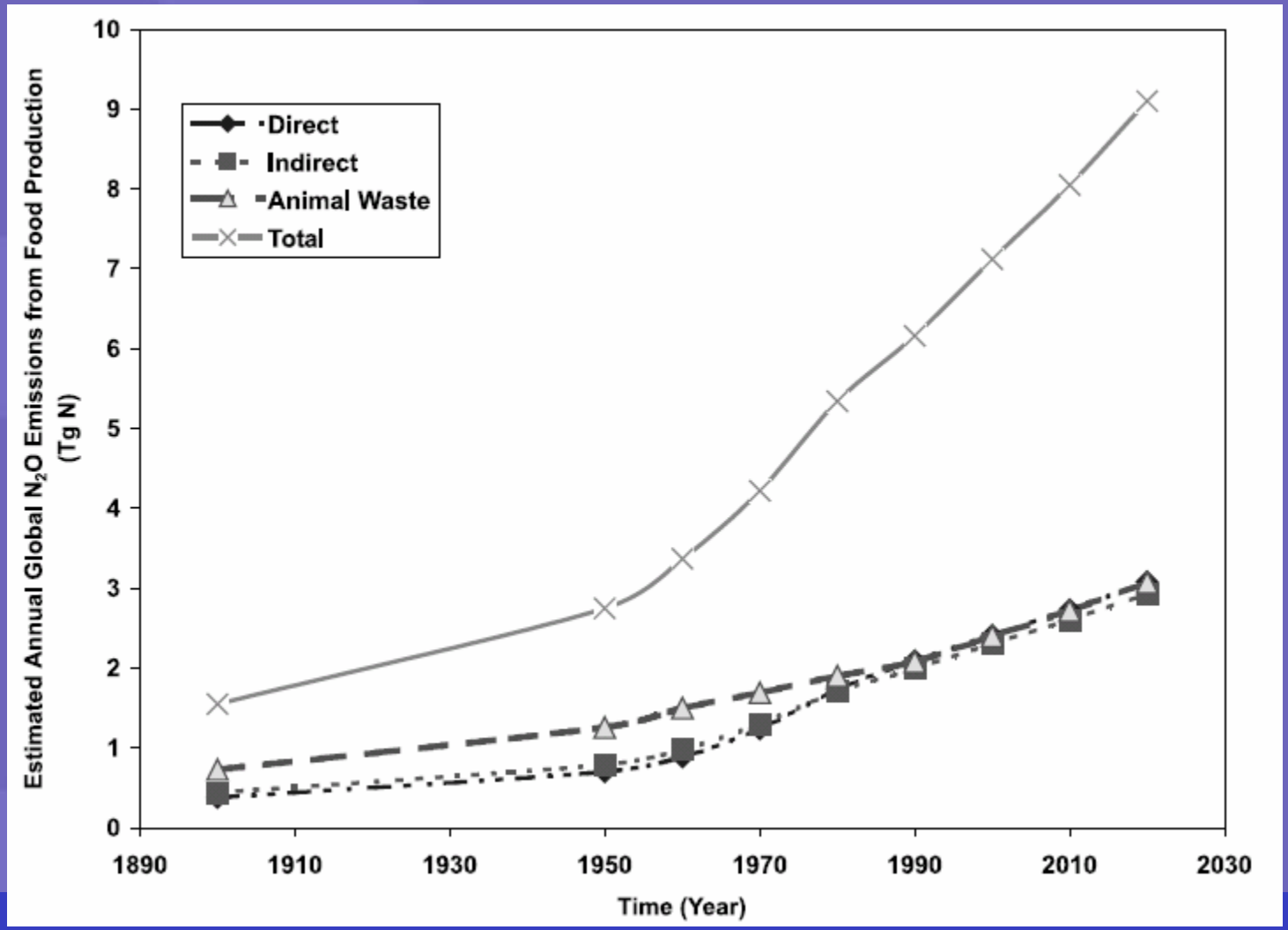
Figure 1.6 Past and projected meat production in developed and developing countries from 1970 to 2050



Source: FAO (2006a) and FAO (2006b).

Steinberg et al 2006, UN FAO

Global N2O Emission Estimates from Food Production



Mosier and Kroeze 2000

Getting It Right

Managing Climate Change will not be possible without the management of reactive nitrogen.

Ammonia nitrogen-rich effluent from covered lagoons should be managed to prevent atmospheric emissions.

ENVIRONMENTAL DEFENSE FUND

Environmental Performance Stds: Covered Lagoons

- Odor
- Pathogens
- Direct discharge
- Soil contamination
- Ammonia emissions